

THERMAL WASTE WATER EVAPORATOR



🔥 Maximum Reduction-
Minimum Residue

🔥 Towards Zero
Liquid Discharge



About us

TruTherma Engineers & Consultants LLP is a leading name in process heating and turnkey engineering solutions. With decades of expertise in energy-efficient thermal systems, we specialize in designing and manufacturing Low capex, compact, high-performance waste water evaporators. Our machines are engineered for industries seeking maximum reduction, minimum discharge, and ZLD compliance.

Why TruTherma?

- Proven expertise in thermal process design
- Customized solutions for varied waste water characteristics
- Turnkey execution – from design to commissioning
- Dedicated after-sales support & service

Introduction

Industries across sectors face the twin challenge of reducing wastewater discharge while complying with ever-stringent environmental norms. Thermal wastewater evaporators offer a reliable and efficient solution, ensuring maximum water reduction with minimum footprint.

Problem Statement

Traditional treatment plants are large, expensive, and often ineffective against complex industrial effluents. The result is wasted energy, higher O&M costs, and environmental penalties. A smarter, low-CAPEX alternative is needed—one that not only reduces wastewater but also aligns with sustainability goals.

Trutherma's Thermal Waste Water Evaporator is an advanced solution, low-CAPEX engineered to minimize liquid discharge, recover reusable water, and reduce waste volume to the lowest possible level. Compact, efficient and customizable, it ensures compliance with Zero Liquid Discharge (ZLD) norms.

Thermal Evaporator working Principle:

Uses direct heating medium to evaporate water from waste water.

Advantages

Simple design, Low Capex, Plug & play, Low in maintenance, Compact low footprint, ideal for small to medium capacities. Can handle high TDS/COD, Does not require dedicated O&M (operation & maintenance) staff.

Process Description

Principle of Operation (How It Works)

Batch process:- 3 batches in 24 hours

- Wastewater is fed into the evaporator.
- Heat energy is transferred via heaters, heat exchangers.
- Water evaporates, leaving behind concentrated residues.
- Vapours are condensed to recover clean water.
- Remaining sludge is collected for safe disposal.
- For Crystallization/ZLD, either the residue is collected in open pan type residue collection vessel for sun drying or stage 2 evaporation is used, which crystallizes the residue to almost zero

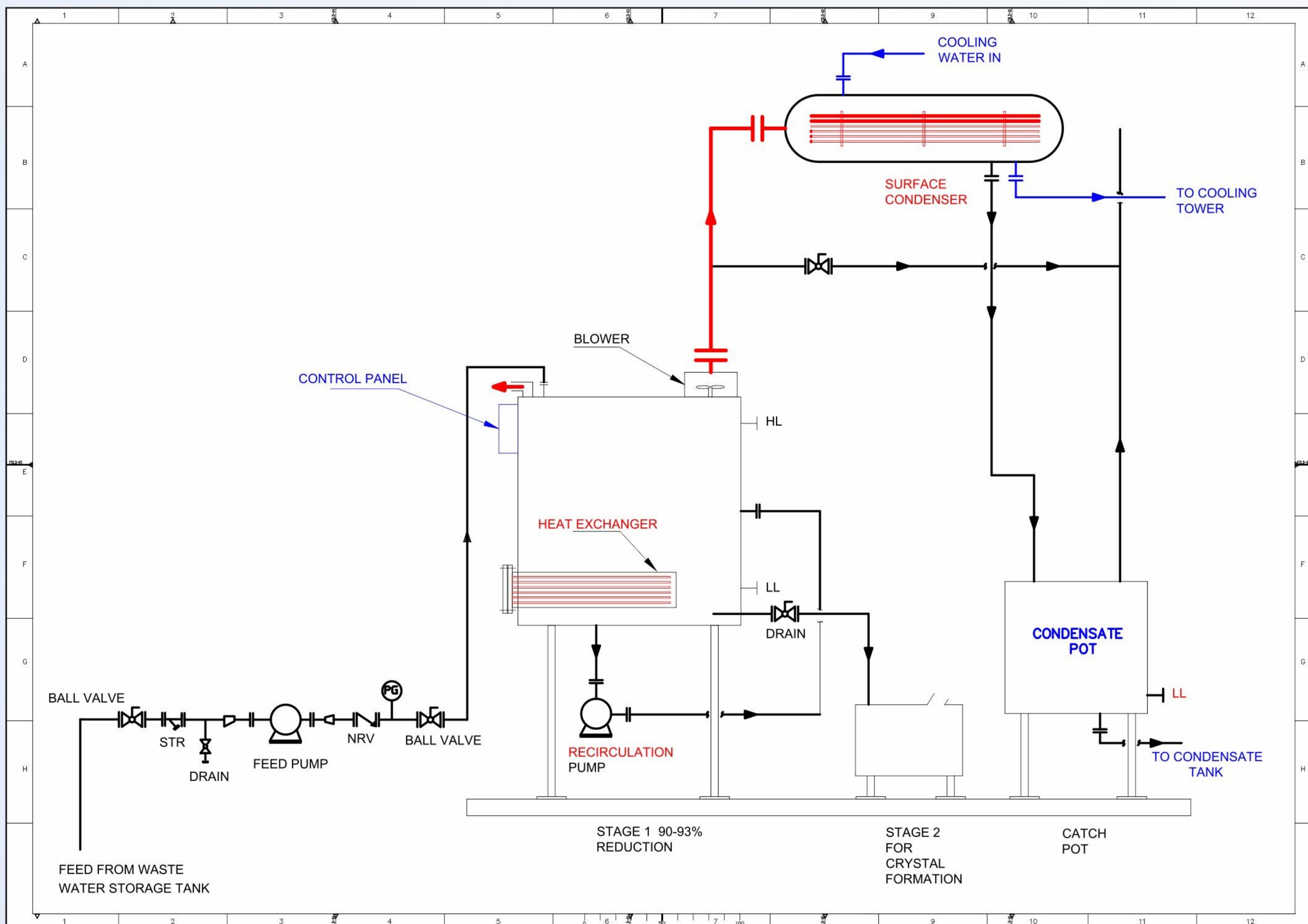
Supported Heat Sources

- Steam 2-3 bar (g)
- Thermic Fluid (up to 300 °C)
- Electrical Heaters , flanged immersion type, incoloy 800 sheath tube.
- Gas based-LPG/PNG

Condensate Recovery Options

- Surface Condenser: High efficiency, water-cooled.
- Air Cooled Condenser: Compact, no water requirement.

PROCESS FLOW DIAGRAM



WASTEWATER → EVAPORATOR → VAPOUR →
 CONDENSER → CLEAN CONDENSATE OUT +
 SLUDGE TANK.

STANDARD MODELS

CAPACITY L/HR	MODEL	HEATING SOURCE	OVERALL DIMENSIONS L*W*H (APPROX)	NET EVAPORATION VOLUME IN. 24 HOURS
20L	TT-E-20E	ELECTRICAL	1600*1200*1900	360
50L	TT-E-50E	ELECTRICAL	1750*1250*2000	810
	TT-E-50S	STEAM	1850*1250*2000	810
	TT-E-50G	LPG/PNG	1900*1250*2500	810
100L	TT-E-100E	ELECTRICAL	1900*1350*2500	1800
	TT-E-100S	STEAM	1800*1350*2500	1800
	TT-E-100G	LPG/PNG	2000*1350*2650	1800
200L	TT-E-200E	ELECTRICAL	2400*1450*2500	3600
	TT-E-200S	STEAM	2400*1450*2500	3600
	TT-E-200G	LPG/PNG	2500*1450*2700	3600
300L	TT-E-300S	STEAM	2100*1550*2800	5400
	TT-E-300G	LPG/PNG	2700*1750*2950	5400
500L	TT-E-500S	STEAM	2400*1750*2800	9000
	TT-E-500G	LPG/PNG	2700*1750*3000	9000
750L	TT-E-750S	STEAM	2900*2500*3000	13500

**CUSTOM DESIGNED CAPACITIES
AVAILABLE ON REQUEST.**

DATA SHEET

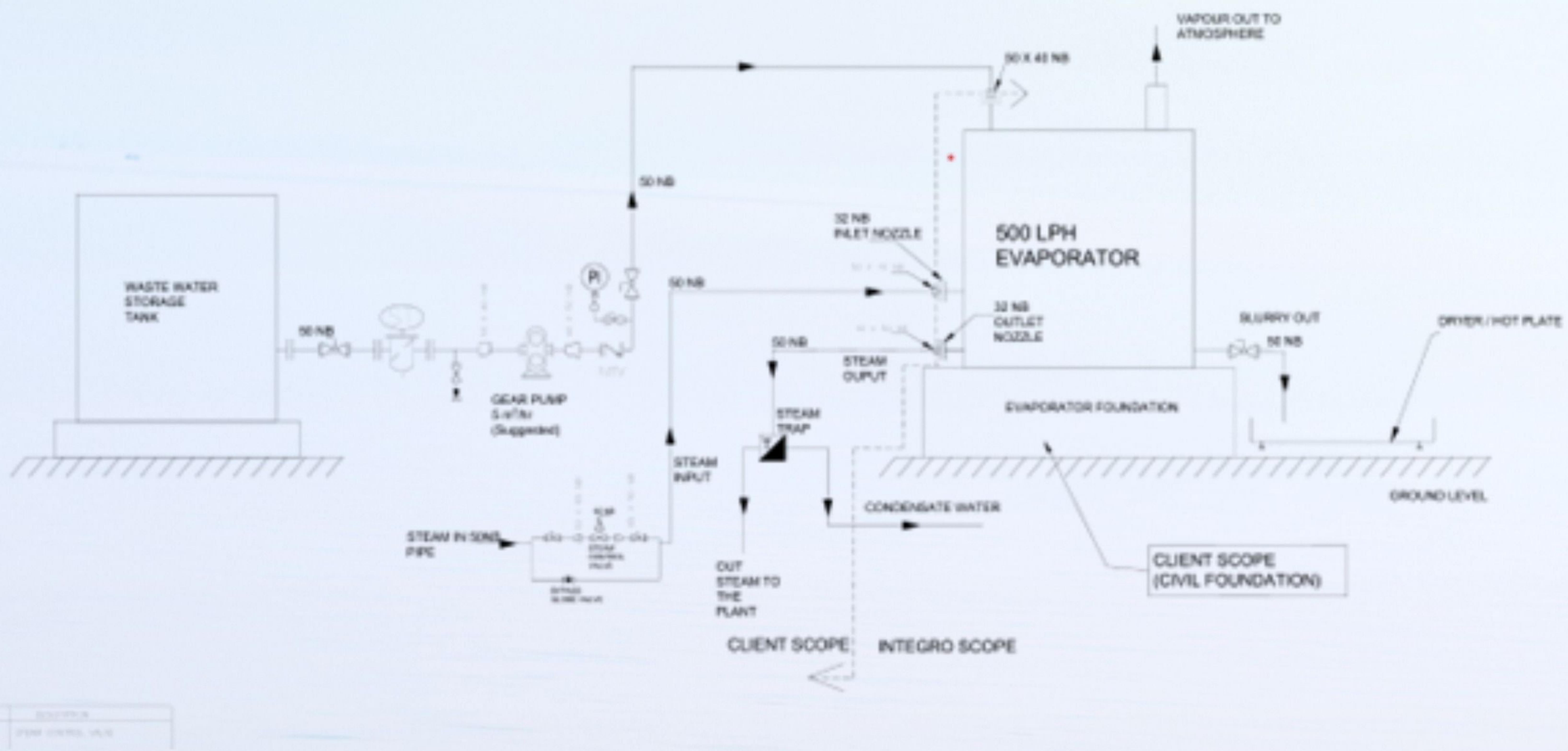
Type of machine	Double skin type with 50mm/100mm thick thermal insulation.
Tank MOC	Inner tank: SS316 L, Duplex/ Super duplex, Titanium Outer skin: SS304.
Tank Type	Rectangle with slopped base
Vapor exhaust	centrifugal blower fitted for fast removal of vapor.
Operating Voltage	415 V, 3 phase , 50HZ
Temperature sensor	RTD, PT100
Level sensor	Specially designed capacitance type level switches for high level and low level.
Recirculation pump	The Boiling tank contents are continuously circulated across the heated surface which gives better heat transfer coefficient by creating strong turbulence at coil surface. This avoids risk of local dry-out/film boiling if heat flux is too high and also reduces fouling /scale deposition on coil surface.
Other accessories	CIP Nozzle for daily cleaning after process. Agitator provided for high TDS waste water
Control panel	Mainly comprising of MCCB, contactor, TIC and relays. Starting system for blower and recirculation pump



ALARMS/AUTOMATION & CONTROLS

- Specially designed capacitance based level switches are interlocked with Heat source to prevent dry run.
- High level is interlocked with feed pump to prevent overfill.
- Fast vapor removal is facilitated by blower. Blower is interlocked with temperature sensor and gets activated automatically at a particular temperature , when vaporization starts.
- Once the particular batch is completed, in addition to the energy source cutoff, there is an audible alarm which provides information to the operator.
- The system can be PLC controlled. (Optional)

TruTherma's Eco-Smart Solutions for Zero Liquid Discharge



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